

# 14. NATURAL RESOURCES MANAGEMENT

*There are some who can live without wild  
things, and some who cannot.<sup>24</sup>*

Management of the physical and biological resources in an ecosystem affects the health and populations of all flora and fauna. This section describes programs that directly affect soil, water, and vegetation, and therefore, wildlife habitat on Fort Richardson. Healthy natural environments and healthy training environments have much in common and the needs of both are of fundamental importance in managing USARAK's natural resources.

## 14-1 Objectives

- ▶ Repair damaged training areas and provide improved troop training environments that can sustain training indefinitely
- ▶ Manage the forest ecosystem at Fort Richardson to enhance ecosystem integrity and produce limited forest products on a sustainable basis
- ▶ Minimize adverse impacts on ecosystem health from disease and insects
- ▶ Improve the quality of habitat for game and nongame species
- ▶ Emphasize habitat development and enhancement for moose, an important game and watchable wildlife species on Fort Richardson
- ▶ Protect and conserve all biological communities with special emphasis on crucial wildlife habitat, seasonal use areas, and ecologically sensitive sites
- ▶ Manage game to support sustainable hunting and fishing programs

- ▶ Manage moose populations so that they do not exceed the long-term carrying capacity of the environment
- ▶ Manage all species to ensure the sustainability and native diversity of ecosystems
- ▶ Protect water quality and its associated values in Fort Richardson's watersheds
- ▶ Manage wetlands to ensure "no net loss"
- ▶ Maintain an aesthetically pleasing cantonment area landscape that leaves natural ecosystem functions intact to the extent possible

## 14-2 Forest Management

There have been no commercial forest sales on Fort Richardson because of a limited market. Also most of the forest is relatively young due to fires in the early 1900s (Elmendorf AFB, 1994). Management of the forest ecosystem, however, is the most critical aspect of land management on the post because such a large proportion of the land is forested and vital to both wildlife and military training.

Forest management and habitat management involving vegetative treatments is required to protect, maintain, and enhance military training environments. Past forest management has produced conditions needed to train our nation's military troops to survive and win on battlefields around the globe. Tree density, ground cover, and other factors are critical for accomplishing the military's mission.

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<sup>24</sup>Aldo Leopold, *A Sand County Almanac*.

Fort Richardson's forestry program has emphasized support of the military's mission, enhancement of the forest ecosystem, protection of forest watersheds, and management of wildlife habitat. It has also fostered outdoor-recreation opportunities and produced some personal-use forest products. The official forest management policy as stated in the Forest Management Section of the *Natural Resources Management Plan* (Quirk, 1990) is "... to provide for the enhancement of those forest values which benefit the Division (currently USARAK) and to protect and maintain the productivity of the forest land.

This policy is meant to support the military's mission and keep other options open regarding recreation and wildlife values. The local market for commercial timber is not likely to improve, and USARAK has few incentives to sell timber on a large scale. Consequently, the existing policy will continue during 1998–2003. This INRMP expands on the details of management over recent years, and USARAK is committed to developing a more specific forest management action plan (Section 11-7b and Appendix 1). Appendix 1 contains a description of the Plan, its compliance authorities, and budget priority. Fort Richardson's forest management program is one of ecosystem restoration and management.

USARAK recognizes BLM's jurisdictional authority and responsibility concerning vegetation and mineral rights on those lands withdrawn for military purposes from the public domain. In this regard, USARAK will ensure that all actions significantly affecting these resources are thoroughly coordinated with and meet the approval of BLM prior to their commencement.

## 14-2a Forest Types

Forests on Fort Richardson are typical of those in interior Alaska, despite the post's coastal location. Section 8-1c and Figure 8-1c summarize the seven types and their areal cover. This data is in the GIS database for use in analyses of forest ecosystems and mission planning.

## 14-2b Management Strategies

Management of the forest ecosystem on Fort Richardson will emphasize the military mission, ecosys-

tem functionality, and recreational opportunities. The management program will utilize data collected through the modified LCTA process (Section 12-3a) and other studies (Section 12-3b) to monitor forest conditions. Changes in forest management might occur on a short-term basis (such as removal of trees for training or insect and disease control). Because production of sawtimber and/or pulpwood is not a primary consideration, this management plan will not require detailed information concerning timber volume and quality.

The information and guidance provided in this section will be in the form of concept or strategy rather than a stand-specific prescription. USARAK natural resources managers will use inventory information to meet objectives for managing the forest ecosystem as a whole.

### 14-2b(1) Commercial Objectives

Commercial objectives of forest management include using the timber cut for military purposes and rights-of-way. Removal of dead and downed timber, primarily beetle-killed spruce, will be conducted only when necessary for safety or mission requirements. Most actions of this nature will require NEPA documentation. Since most of the dead and downed timber is in fairly steep, relatively inaccessible areas, few, if any, salvage sales are anticipated during the next five years. USARAK will investigate, in coordination with BLM, the feasibility of selling forest products for landscaping, fuelwood purposes, and as Christmas trees.

### 14-2b(2) Military Mission Objectives

The military needs to train soldiers in a variety of environments and situations. Accomplishing this part of the military mission may require removal of trees to create open areas for drop zones, small-arms ranges, antenna fields, or construction. Thinning of trees to improve bivouac areas may also be necessary. When such activities require the thinning or removal of more than 20 trees over four inches in diameter, or 100 trees less than four inches in diameter, written authorization must be received from Range Control or the Natural Resources Branch office prior to commencement. These actions may require NEPA documentation. Meeting military mission requirements will remain the primary objective of forest management in 1998–2003.

#### *14-2b(3) Ecosystem Functionality Objectives*

Protecting ecosystem function is the most important aspect of forest management. It is important to maintain a wide variety of age and species classes (Section 12-3a(1)), protect and allow the development of old growth (Section 13-5a), protect watersheds (Sections 13-5c and 13-5g), and protect options for future management as more information becomes available. Sections 13-2 and 13-3 provide ways to protect forest ecosystem functions from damage by the military mission.

#### *14-2b(4) Recreation and Aesthetic Objectives*

Forests cover about 70 percent of Fort Richardson. They are critical to the production of fish and wildlife for consumptive and nonconsumptive recreation. Forests also provide most of the visual impact characteristics of the installation. Forest management practices will be consistent with maintaining aesthetic values and enhancing recreational opportunities.

### **14-2c Harvest**

In 1996 and 1997, approximately 50 acres of mature forest were cut for expansion of the Malemute Drop Zone (DZ). Free permits were given to the public for personal use of the timber and fuelwood to expedite the clearing. In 1998, an additional 50 acres is scheduled for clearing. The ultimate goal is to clear approximately 300 acres of mature forest for expansion of the Malemute DZ to a suitable size to accommodate current and future military training operations.

As a result of spruce bark beetle infestations, there are many (undetermined) acres of dead or dying timber. Much of the dead wood occurs on the lower slopes of Training Areas 11A-D, 12A, and 14A. Most of the affected timber on steeper slopes will not be removed because it would cause unnecessary environmental damage, open the area to trespass, and require that training on weapons ranges be interrupted for significant periods. It is also difficult to justify removing dead wood from sites on steep slopes with few, if any, existing roads.

Commercial sales of forest products for timber, pulp, or fuelwood are not anticipated as there is a limited market and other vast forest resources in south-

central Alaska. In addition, many forested areas on Fort Richardson are young or middle-aged stands that would not be suitable for harvest at this time. The management of the forest ecosystem is probably the most critical aspect of land management on the post due to the high percentage of forested land and its importance to wildlife habitat and the military training mission.

Fort Richardson's Forest Management Program is jointly managed by the Army and the BLM on lands withdrawn for military purposes by PLOs and EOs. These real estate instruments gave the BLM jurisdiction of mineral and vegetative resources. Small parcels of fee-owned land on post (homesites and other private land holdings purchased by the DOD) are managed solely by the Army.

Because of BLM's involvement in the vegetative treatment aspect of forest and habitat management on Fort Richardson, sales of forest products on withdrawn lands would have to satisfy their requirements. One mechanism for accomplishing this would be for the Army to purchase stumpage from the BLM as a sole source contractor and then re-sell the forest products. This circuitous process would require a Memorandum of Understanding (MOU) between the two agencies.

### **14-2d Timber Stand Improvement**

Timber Stand Improvement (TSI) activities were developed to improve species composition, quality, and/or growth rate of existing stands. TSI includes thinning or removal of undesirable trees, controlled burning, pre-commercial harvest, pruning, and similar activities.

Considering the low commercial value of forests on Fort Richardson, there is little reason to use TSI. The one technique that might be justified is controlled burning, but that option is not viable due to a narrow burning "window" and air quality restrictions. (See Section 14-3a(2) for a more complete discussion of burning as a management tool).

### **14-2e Regeneration**

With the exception of habitat management for moose (discussed in Section 14-3a(1)), and a small number of acres for a study by Oregon State University,

no artificial forest regeneration is planned. Natural regeneration will be relied upon following harvest. There might be some advantages in artificial regeneration of spruce in areas where losses due to the spruce bark beetle are high. But costs of such regeneration, combined with uncertainty of success, make this management technique very difficult to justify.

## 14-2f Forest Product Sales

### 14-2f(1) Administration

Since BLM retains jurisdiction of vegetative resources on Fort Richardson's publicly withdrawn lands, any timber or forest product sales would be administered by them.

On Army owned lands, the post commander has the authority to conduct commercial and non-commercial (personal use) forest product sales if receipts are less than \$1000 per individual sale and \$20,000 total per year. If sales receipts are projected to exceed these ceilings, the sale must be administered by the Corps of Engineers.

During 1998–2003, demand for local forest products is expected to be relatively low and therefore little emphasis will be placed on their sale.

Any future opportunities for USARAK to conduct forest product sales on withdrawn lands will require legislative changes in existing EOs, PLOs, and their associated amendments.

### 14-2f(2) Planning

Any future forest product sales as well as other forest management practices will be coordinated with Range Control to ensure minimal disruption of military training. Scheduling will usually be three to six months in advance of activities.

### 14-2f(3) Markets

Valley Sawmill is the closest market for Fort Richardson sawtimber. The current market for sawtimber is limited, and the post has little of what is considered high quality. There is also no market for pulpwood, as the lack of bidders for the 1995 timber sale designed to clear land for the Malemute Drop Zone expansion project clearly indicated. This wood was appraised at \$30/MBF and \$25/cord. No

response was obtained during the first attempt to sell the timber even though over 20 potential bidders were contacted.

There are potential markets for seedlings for plantings. Commercial nurseries would likely be interested in such seedlings.

Harvest plans will be prepared prior to commercial sales of forest products. Plans will include sale boundaries, cruised volume, silvicultural prescription, road layout, best management practices for prevention of soil erosion and sedimentation, water quality considerations, cultural resources protection, wildlife considerations, harvest method(s), scaling requirements, slash disposal, site preparation, and regeneration requirements. Documentation for compliance with NEPA as well as required cultural resources surveys will be completed prior to sales.

## 14-2g Forest Disease/Insect Control



Spruce bark beetle.

The primary forest insect problem on Fort Richardson is the spruce bark beetle (*Dendroctonus rufipennis* [Kirby]).

This forest pest has been active throughout southcentral Alaska for over 25 years and especially in the Anchorage vicinity since the early 1990s. The initial outbreak on Fort Richardson occurred in 1991 along the Knik Arm of Cook Inlet north of Glenn Highway and has since spread through the installation. The mature white spruce trees primarily attacked and killed grow as individual trees or in scattered clusters throughout Fort Richardson north of the Glenn Highway. The impact in this area has been minimal due to the limited number of trees that were susceptible to beetle attack.

The spruce bark beetle prefers white spruce trees that are greater than six inches in diameter; black spruce is rarely attacked. Mature forests are most susceptible. Outbreaks generally last four to five years and then collapse. The spruce bark beetle sometimes kills virtually all trees in older, dense stands, which makes natural regeneration of white spruce more difficult due to the resulting lack of seed sources. White spruce only produces good seed crops about once every five years. The spruce bark beetle

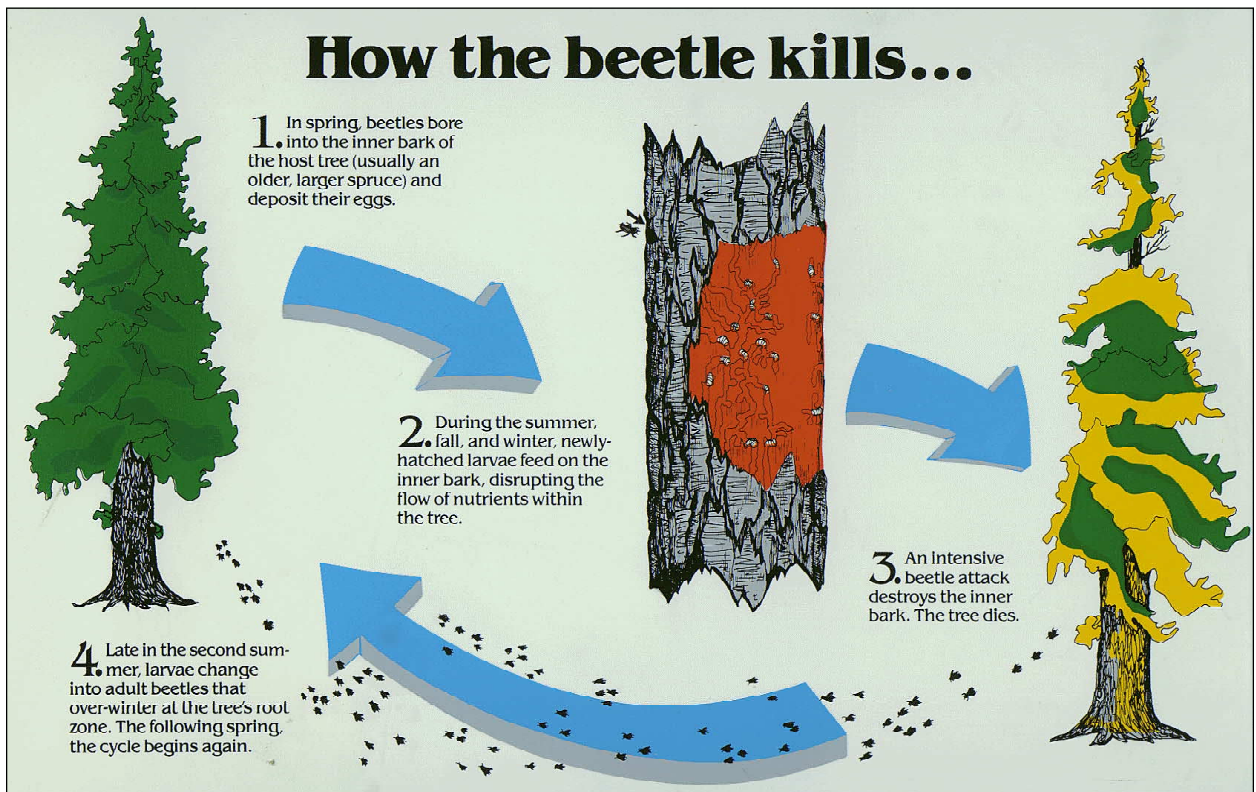




*Spruce tree dying from beetle attack (note yellowing).*



*Spruce bark beetle holes.*



*Spruce bark beetle life cycle.*

larvae live between the bark and wood, and when mature, the beetles emerge from infested trees and fly to new trees in mid-May to mid-June. Beetles prefer to fly to downed trees (Holsten et al., undated).

White spruce seed germination requires disturbance of mineral soils. Under natural conditions these disturbances are associated with glaciation, fire, flooding, etc., but human activities, in particular fire suppression, have reduced these regimes (Dr. Edward Holsten, pers. com., 1995).

Spruce bark beetle infestations may result in invasions by species such as bluejoint grass, a native, perennial invasive species. When a closed spruce canopy is reduced by 40 percent or more, conditions are good for bluejoint grass invasion. This is especially true if there is inadequate scarification to promote good seedbeds. Logging during winter often fosters prime conditions for bluejoint grass due to little soil disruption of frozen grounds (Dr. Edward Holsten, pers. com., 1995).

Major insect outbreaks may cause changes in habitat for many wildlife species, such as songbirds and raptors. Those species that prefer older, more mature forests will experience a habitat quality decline while those preferring younger successional stages (or dead timber) will benefit from these changes.

The best prevention tactic to reduce spruce bark beetle damage is managing for a diversity of species and age classes within the forest. Thinning of the canopy by at least 40 percent may help by warming the soil and reducing competition. Bluejoint grass favors lowered soil temperatures while spruce and birch favor warmer soils (Dr. Edward Holsten, pers. com., 1995).

The spruce beetle outbreak in southcentral Alaska is symptomatic of stagnating forest ecosystems. The combination of mature spruce and a reduction in natural disturbance is ideal for the spruce bark beetle and associated changes in the forest ecosystem (Dr. Edward Holsten, pers. com., 1995).

Most mature white spruce on Fort Richardson have been attacked and killed by the spruce bark beetle during the past six years. A short historical summary of beetle activities on Fort Richardson is as follows.

The area north of Eagle River showed the first signs of a serious outbreak of spruce bark beetles in 1991. Mature white spruce in this area are usually found growing as isolated and widely scattered individual trees in deciduous forests. A few patches or clusters of pure spruce grow along Knik Arm, which is where the greatest mortality occurred. Some of the dead spruce have been toppled by strong wind storms but the overall affect of white spruce mortality and fuel loading in the area north of Eagle River is minimal due to the small number of trees susceptible to beetle attack and damage.

The Chugach Mountain slopes above the Small Arms Range complex were attacked in 1994 and 1995. Most of the mature spruce in this area have died as a result. Approximately 40–80 percent of the forest on these slopes are comprised of white spruce trees. One patch of white spruce above Grezelka Machine Gun Range up to treeline near Infantry Flats on Site Summit is one of the largest patches of pure white spruce on Fort Richardson. The beetles have completely wiped out this area of spruce. This site represents the most extensive beetle damage on Fort Richardson, both in the number of spruce trees killed and the size of the forest attacked. Hiland Mountain, above Grezelka Machine Gun Range, is covered with deciduous trees and young white spruce saplings as a result of a wild fire that burned through this area over 30 years ago—there was no beetle damage to the young white spruce in this area.

Approximately 10–20 percent of the forest in the Ship Creek drainage and mountain slopes consists of white spruce forests. Most of the mature spruce in this area was killed by the beetles in 1995. Although some of the mature white spruce near the fairways of the Moose Run Golf Course have been killed by the beetles, many are still healthy and have survived the beetle attack.

On the Chugach Mountain slopes south of Ship Creek, forest composition is made up of approximately 10 percent white spruce. This area was infested with the beetles, and by 1996 most of the mature spruce had been killed. The few mature white spruce trees near Davis Range also were killed by spruce bark beetles by 1996.



The beetles have been active in most of the mature spruce forest patches near the cantonment area since 1995. Some of the mature spruce have succumbed to the spruce bark beetles, however, many large spruce trees have survived beetle attacks. A White Spruce Protection Project proposal and funding request has been submitted to the USFS. Should funding be made available, a thorough inventory will be made of all large surviving white spruce trees in and around the cantonment area. The inventory would be followed by the preparation and implementation of a comprehensive plan for protection and treatment of remaining trees. Treatments will be scheduled in accordance with priorities set forth in the plan. This subject is further discussed in Sections 14-13a(2) (Cantonment Area Management).

Several insect defoliators including the mourning cloak butterfly (*Nymphalis antiopa*), spear-marked black moth (*Rheumaptera hastata*), large aspen tortrix (*Choristoneura conflicana*) and the spruce budworm (*Choristoneura* spp.), periodically cause some loss of growth in isolated stands. These outbreaks have been very limited and cause relatively little damage. Large-scale control is neither needed nor feasible.

Some trees are infected with a fungus called heart rot. It is especially prevalent in birch stands over 80 years of age (Elmendorf AFB, 1994). Heart rot is best managed by maintaining relatively young stands, but this is incompatible with the noncommercial objectives of forest management on Fort Richardson. The ecological role of older trees with heart rot outweighs the advantages of maintaining younger stands, especially considering the scarcity of older stands on the post. There are no other serious forest insects or diseases known to occur on Fort Richardson.

## 14-2h Special Considerations

### 14-2h(1) Troop Use of Timber Products

Although troops are permitted to harvest forest products for achieving training objectives, unnecessary damage to or destruction of trees is to be avoided. See Section 14-2b(2) for information regarding tree thinning and removal requirements. Stumps must be less than six inches high (U.S. Army Alaska,

1995). Any significant clearing operations will require prior NEPA documentation.

### 14-2h(2) Special Area Considerations

Section 13-5 outlines procedures for protecting special areas on Fort Richardson, some of which require special consideration through the forest management program. Old-growth will be protected in some areas, cultural resources will be considered in cutting activities, and wetlands must be preserved. There are also special provisions for protecting important areas such as the Ship Creek/Glenn Highway greenbelt, lakes, alpine tundra, the North Fork of Campbell Creek, designated waterfowl refuges and nesting areas, and wildlife sanctuaries.

### 14-2h(3) Other Forest Management Considerations

The restrictions listed below will be in effect with regard to forest management operations.

- ▶ Old-growth forest will not be altered unless essential for military training. Written approval from both Range Control and USARAK Natural Resources is required prior to commencement of any activities affecting old-growth vegetation.
- ▶ Areas identified as being environmentally sensitive or important will not be clear-cut unless required for military training and previously approved in writing by both Range Control and USARAK Natural Resources.
- ▶ Only selective cutting methods will be used within 300 feet of streams, lakes, wetlands, and developed recreation sites. Prior written approval from both Range Control and USARAK Natural Resources must be obtained before commencement of such activities.
- ▶ Unless federal standards (including those described in this INRMP) are higher, USARAK will use standards accepted by the Alaska Department of Forestry or specified in the Alaska Forest Practices Act (AK Statute 41.17).
- ▶ Insects and diseases (discussed in Section 14-2g) will be considered when making decisions regarding forest management on Fort Richardson.

## 14-3 Habitat Management

*“That which is not good for the bee-hive cannot be good for the bees.”<sup>25</sup>*

It is difficult to differentiate habitat management from forest management and training land rehabilitation, as all three are interrelated. The following sections describe vegetation management programs specifically designed to benefit wildlife.

USARAK will develop a Habitat Management Action Plan for inclusion into this INRMP (at Appendix 1). The plan will expand on management projects described below. Appendix 1 contains a description of the plan, its compliance authorities, and budget priority.

### 14-3a Management of Terrestrial Habitat

#### *14-3a(1) Management of Moose Habitat*

Management of wildlife habitat on Fort Richardson will concentrate on benefiting moose, the installation’s most numerous large mammal. The program entails vegetative manipulation to stimulate growth of young willow shoots for winter moose browse.

There is an increasing need for enhancement and expansion of moose habitat on Fort Richardson. Primarily, two important factors are driving this need. One is reduced habitat quality and the eventual loss of habitat by vegetation succession. The other is the loss of quality habitat by urban and training expansion projects. Vegetation succession marches onward and quality habitat becomes overgrown and unproductive. During recent years, hundreds of acres of quality habitat have been lost to a new Anchorage Regional Sanitary landfill, a new Regional Base Hospital (Elmendorf AFB), expansion of Army National Guard Facilities, expansion of Malemute Drop Zone, and many other smaller projects. Habitat will continue to be lost to these types of expansion projects.

A draft Moose Browse Habitat Enhancement Plan has been developed by USARAK. This plan, along with advice from wildlife biologists with extensive

moose habitat management experience and input from BLM regarding vegetation management, form the basis of the habitat management program discussed below.

#### 14-3a(1)(a) Habitat Management Tools

Fort Richardson’s biologists have actively managed moose foraging habitat for over 20 years. The primary method used to achieve high-quality/high-biomass winter moose range on Fort Richardson is centered around enhancing currently used moose habitat. Consisting of early succession deciduous plant communities with a high willow component, this habitat has grown too tall and decadent and has become highly unproductive. Enhancement of these past-prime habitats is accomplished primarily by mechanically cutting and recycling the woody plants, using a Hydro-Ax™, prior to bud-break in the spring (April) or after vegetative growth ceases in the fall (September). An alternative method is cutting the woody vegetation at ground level by scraping the soil surface with a bulldozer blade during the late winter when the ground is frozen. Mechanically cutting desirable deciduous plants causes prolific resprouting from intact root crowns thereby increasing the annual production and growth rates during successive growing seasons.

A second method of increasing winter moose range on Fort Richardson involves converting forested areas, which have little value for moose habitat, to early succession deciduous plant communities. The forest removal operation can be accomplished by use of the Hydro-Ax™ with the rotary cutting head



*Hydro-Ax™ rotary cutter.*

<sup>25</sup>Marcus Aurelius, Roman Emperor, *Meditations*, bk. 6, sct. 54.



for small trees up to three inches in diameter. Larger trees can be removed by shearing them off with the feller-buncher attachment on the Hydro-Ax™.

The trees also can be removed in late winter when the ground is frozen, using a bulldozer to snap off trees and other woody vegetation at ground level. Deciduous rootstocks in the soil will resprout and produce woody vegetation communities of willow, birch, and aspen, all desirable browse for moose. Undesirable plant species, e.g., alder and spruce, will also become established and will be a component of the vegetative community.

A third method for increasing winter moose range on Fort Richardson is to plant willow shoots or bundles in areas desirable for this treatment (recently cleared areas with low density willow root stocks and a low perennial grass component, e.g., primarily *Calamagrostis* and *Arctagrostis* species). Willow shoots must be collected in March or early April prior to flowering and placed in cold storage until planting time in June. The roots must be treated with a growth hormone to promote adequate root development.



Hydro-Ax™ with feller-buncher attachment.

Removal of trees for forest management, personal use, or military purposes also can improve moose habitat in some cases. Treatments could include salvage operations and construction and clearing for rights-of-way. Since the cost of these treatments would be incurred anyway, the additional cost for improving moose habitat would be minimal unless special efforts, such as additional removal, planting, or chemical controls, are undertaken. For example, if cutting firewood removes trees greater than four inches in diameter, it is less expensive to use the Hydro-Ax™ to complete a moose habitat improvement project.

Competition from *Calamagrostis* spp. can be reduced by using chemicals such as Roundup®, which would cost about \$100 per acre. USARAK is providing a study area to the USFS in cooperation with Oregon State University for experiments with this chemical as part of a spruce regeneration study. The ADF&G's biologists report relatively poor success using only Roundup® to control *Calamagrostis* spp. (Bill Collins, pers. com.). The chemical effectively kills the grass, but does not guarantee immediate establishment of other, more desired species. One solution might be to plant willow shoots and disseminate birch seed in the treated area. Fire will remove this grass, but it is generally too hot and fast to expose the mineral soil. Additionally, prescribed burning is not an option due to air quality restrictions by the Municipality of Anchorage. Mechanical scarification is needed to expose this soil if willow and other species are to successfully regenerate and compete with the grass.

#### 14-3a(1)(b) Treatment Areas

There are at least two methods for improving moose-browse habitat in terms of the type of areas to be treated. The first of these is to improve habitat already vegetated with species preferred by moose. On Fort Richardson, willow is the browse preferred by moose, but balsam poplar, birch, and aspen are also of some value. In general, areas with these species are on the coastal plain below 500 feet in elevation.

The other method is to convert areas not already rich in good forage plants to species that are preferred by moose such as willow and birch. This is accomplished most commonly by converting areas

dominated by spruce to willow or by planting willow in areas that have been disturbed, perhaps in conjunction with LRAM activities. Converting spruce to moose forage habitat is possible on drier sites, but burning would be needed to keep spruce from regenerating and outcompeting the browse species. The best tactic would be to burn the area five to six years after removing the spruce overstory. This would kill the spruce seedlings, and further regeneration would be unlikely because spruce seed remains viable only for about two years. However, as burning is not an option on Fort Richardson (Section 14-3a(2)), this technique will not be considered.

A more realistic option would be to let the deciduous plants grow with the spruce seedlings and then Hydro-Ax™ the spruce once they begin to dominate the browse species. The woody shrubs would resprout, whereas the spruce would die.

The proximity of vertical cover or the “edge effect” does not appear to be as important to moose as it is to other species, especially during winter. There is considerable evidence (Bill Collins, pers. com.) that moose will use feeding areas that are a considerable distance from cover in the winter. During periods of hot sunny weather, moose move relatively long distances to find cover for shade. In winter, moose are likely to use cover to evade harassment or predation rather than protection from the elements. Treated areas normally provide cover within several years.

It is important to expose areas managed for moose browse to maximum sunlight. Long, narrow areas that are largely shaded are not conducive to good browse production. Ideally, treatment areas, particularly small ones, should be round or square in shape to maximize their exposure to sunlight. USARAK will treat areas that range between 10 to 40 acres, or even larger in some cases. Areas will be shaped to maximize exposure to sunlight. If areas greater than 40 acres are treated and birch is the desired regeneration species, islands of birch will be left as seed sources. These islands are also useful for moose bedding, especially during warmer days.

#### 14-3a(1)(c) Scheduling Treatments

Rotation age is a forestry term, but it is also appropriate for the regular renovation of wildlife habitat.

It can take from two to five years to produce quality browse following Hydro-Ax™ treatments to stimulate regrowth in old and unproductive moose habitats. It may take even longer (up to ten years) to produce high quality moose browse in forested areas newly cleared for moose habitat. Preferred vegetation may last 10 to 12 years before unbrowsed species such as alder and spruce grow tall enough to dominate and shade out the desirable woody plants. A 12 to 15-year rotation schedule is therefore planned for re-treating established moose browse areas.



*Willow sprouting is monitored for several years following Hydro-Ax™ treatments.*

The time of year for re-treating overgrown moose habitat is important. Cutting vegetation when food reserves are stored in the upper part of a plant can reduce vigor and weaken its condition for several years. Woody shrubs should be cut in April, before carbohydrate reserves are translocated from the roots to the above-ground portions of the plant, or in September, after the growing season has ended and food reserves have been stored in the roots. Cutting vegetation in April is desirable because it produces quick and vigorous regrowth, providing an available food source within 6 months after treatment.

Another important factor is the height at which stems are cut. To induce sprouting from the roots, young woody shrubs should be cut within two to four inches above the ground surface. Older woody shrubs can be cut higher from the ground surface and still result in root sprouting. Cutting eight inches above the ground may not eliminate small spruce seedlings, which would defeat the purpose of the treatment.

#### 14-3a(1)(d) Plans for 1998–2003

There is a large backlog of work to be completed for moose habitat management on Fort Richardson. During 1998–2003, this habitat management will emphasize the maintenance of existing feeding areas by recycling over-mature woody browse species such as willow, birch, and aspen. This strategy will produce the most economical and efficient results. The habitat maintenance work will be accomplished using the Hydro-Ax™. A second option for providing moose habitat is to create new browsing areas by removal of forest stands, thereby converting the areas to early succession vegetation. Treatments for the habitat expansion work may be completed in two to three-year intervals. Willow plantings are another habitat expansion technique and may be conducted in damaged areas where the vegetative mat has been removed. This technique could also be used in conjunction with other projects such as repairing training lands under the LRAM Program (Section 14-11) or during mitigation or construction projects.

Using the vegetation map that will be completed in 1998, prime moose habitat (containing large percentages of willow, birch, and aspen) will be identified for potential habitat improvement. Areas with steep slopes (above 20 percent) and areas containing or having a high potential for *Calamagrostis* spp. will not be included. This analysis will be accomplished using the GIS with adequate “ground truthing” to assure the vegetation is characterized properly. The “bullseye” procedure (Section 12-4a(1)) will be used to identify important habitat. Aerial photographs and ground surveys also will be used to locate potential sites for habitat improvement.

Sites selected for habitat improvement will be placed within one of 12 habitat treatment groups. Each treatment group will encompass approximately the same number of total acres. Component sites within each of the 12 treatment groups will be selected in such a way as to ensure that each group has widespread and even distribution throughout the post. The objective is to have selected sites north of Eagle River (i.e., Neibar Drop Zone, McLaughlin Range, the firewood cutting areas, and other previously cleared forest sites), within the cantonment area and north of the Glenn Highway (i.e., cemetery, landfill, an-

tenna field, Bryant Army Air Field, Bartlett High School, and Ammo Area A), and south of the Glenn Highway (i.e., small arms complex, McVeigh Marsh, Bunker Hill area, clear cut plots, and other previously cleared forest sites).

Each of the 12 habitat treatment groups will receive treatment during one of the next 12 years. The timing of the treatment for any one site will be based on current age and condition of the vegetation. Treatment rotation for moose habitat will be delineated on the GIS. The Hydro-Ax™ will be scheduled for use at each site, but may require short term adjustments. For example, a very cold winter might open the option of using a bulldozer to snap trees, or mechanical breakdowns could mandate the use of other equipment.

Long term adjustments may become necessary if equipment or operators are unavailable in any given year, or unforeseen deficiencies in moose habitat become evident in certain areas, or for other practical reasons. These long-term changes will be tracked using the GIS.

Below is an initial list of high priority areas scheduled for treatment during the first few years of this program.

- ▶ Bartlett High School (140 acres)
- ▶ McLaughlin Range (150 acres)
- ▶ Antenna Field (180 acres)
- ▶ Small Arms Range Complex (150 acres)
- ▶ Davis Range/Bunker Hill (130 acres)
- ▶ Roosevelt Road (100 acres)
- ▶ Elmendorf Moraine (230 acres)

Depending on tree size (maximum 4" diameter) and density, the Hydro-Ax™ with the rotary head attachment can treat from 5 to 10 acres of over-mature moose habitat per day. Effective Hydro-Ax™ treatment normally will require a single pass over the vegetation for proper cutting and mulching of the woody stems and saplings. Where whole or nearly whole stems and saplings remain after one pass, a second pass with the Hydro-Ax™ may be required to complete the mulching so that only small woody





*The Hydro-Ax™ can clear 5 to 10 acres of small trees per day.*

pieces remain. Because decay is very slow in northern environments, it is important to ensure that adequate mulching of the vegetation takes place. This will encourage rapid breakdown and expedite the release of tied up nutrients that are crucial for successful regrowth.

Section 22 discusses ways to increase the amount of moose habitat treated by Roads and Grounds crews. The option to use contract support also is available if the capability of in-house resources is exceeded by the requirements.

If opportunities for establishment of willow as part of other projects become available, USARAK will take advantage of them. Willow shoots will be cut in early April, cold stored, and planted in June. This is a labor-intensive technique, but it shows promise for the eventual establishment of willow for moose habitat. It should only be used on good sites where the potential for eventual establishment of willow is high.

#### *14-3a(2) Prescribed Burning*

Prescribed burning would be highly beneficial for habitat management on Fort Richardson; however, such burning is difficult, both politically and ecologically. The prescribed burning “window” (between loss of snow cover and green-up, usually late May–June) is very narrow and sometimes nonexistent. Often this period is wet, which makes burning difficult. Winds must be such that they do not blow smoke into urban areas, further restricting such activities.

Burning can be an effective control of bluejoint grass, but fires must be very hot, and conditions are

seldom right for this at Fort Richardson. During late May–June fires often are not hot enough to kill the grass, due to frozen soils. One way to accomplish this is to cover the ground with slash the year before or use dead and down timbered areas to get enough fuel for a hot fire. Late summer is too green for hot fires unless a desiccant is used, which is difficult and expensive (Holsten, pers. com.).

Air quality permits can be obtained from the Municipality of Anchorage for training firefighters, but not for routine burning, such as a regular prescribed burning program.

#### *14-3a(3) Alder-Bluejoint Grass Conversion*

Alder and bluejoint grass often are considered “nuisance plant species” even though they are native to Alaska. Both respond to disturbance and clearing and are increasing to the detriment of more preferred species. Both species are hardy and difficult to eradicate from a given location.

USARAK Natural Resources will intervene in projects that promote the propagation of these species. Clearing techniques will be recommended that favor growth of the more desirable vegetation species.

#### *14-3a(4) Artificial Nests*

Artificial nests enhance habitat for geese, cavity-nesting ducks, and some other waterfowl species. In addition, such structures have been used to manage such diverse species as loons, osprey, swallows, bats, and various raptors.

USARAK has goose platforms on McVeigh Marsh and loon nesting platforms on some lakes. There has been some question, however, to whether the goose platforms are necessary. Unless there is evidence that nest sites are a limiting factor for geese, additional platforms will not be built. Loon platforms may be constructed by Boy Scouts, or other volunteers, and they will be made of logs with wire mesh, per ADF&G specifications.

#### *14-3a(5) Vegetation Fertilization*

Vegetation fertilization is an option for habitat management. On Fort Richardson, this technique might be cost beneficial to willow establishment or management (Section 14-3a(1)). During 1998–2003, the post will experiment with fertilizing willow. This

will be done only in areas where tall grasses (*Calamagrostis* spp. and *Arctagrostis* spp.) are absent or found in low density in the vegetative community. The cost:benefits ratio of this option will be evaluated carefully before it is taken beyond the experimental stage.

#### *14-3a(6) Salt and Mineral Blocks*

Forty, 50-pound salt and mineral blocks will be placed throughout the training lands each year during 1998–2003. Blocks will be put out in early summer in a well-distributed manner during other operations. Helicopter drops are particularly efficient. This program will be implemented in 1998–2003 for four reasons: blocks will be used by wildlife, blocks may be helpful in maintaining proper nutrition, the program would be popular, and the program is relatively inexpensive.

### **14-3b Fencing Policy**

All fences that hinder the natural migrations or other movements of wildlife will be modified or removed, unless the purpose of the fence is to keep wildlife out of a given area. All new fences will be constructed with the objective of maintaining or improving wildlife mobility in important habitat areas. Fence design will be such as not to impede wildlife movement or military training.

### **14-3c Aquatic Habitat Management**

There are limited options for aquatic habitat management on Fort Richardson. One option that will be employed as needed will be the removal of beavers, beaver dams, and flood debris from creeks and fishing lakes to improve salmon migration, prevent roads from being flooded, and prevent post functions from being impeded. This work will be accomplished on a case by case basis with appropriate permits and associated documentation. Projects which affect anadromous fish habitat requires prior approval of the ADF&G through its Fish Habitat Permitting Program.

## **14-4 Game Harvest Management**

### **14-4a Population Trends**

Section 18-4 discusses game population trends in a general way, with comments regarding the poten-

tial of game populations to support increased hunting or fishing.

#### *14-4a(1) Moose*

From the 1940s to the 1960s, the post was used extensively for mechanized troop training, resulting in disturbance to many areas. This promoted the growth of early successional species such as birch, aspen, alder, and willow. These species provided excellent moose habitat over large areas and caused the moose population to substantially increase.

In the late 1960s, there was a decrease in mechanized ground-training activities. Extensive areas of moose habitat eventually reverted to tall brush and timber. Both the quantity and quality of moose browse began to decline. Remaining prime moose habitat was over-browsed, and the moose population declined after moderately severe winters in 1970–71, 1971–72, and 1974–75.

Active habitat management utilizing a Hydro-Ax™ to clear mature brush and promote regeneration of browse was initiated in 1975. The first Hydro-Axes™ used on Fort Richardson for habitat work were loaned to the Army by Alyeska Pipeline Service Company. Biologists operated these machines and cut approximately 150 acres of brush in August 1975, in the Davis and Small Arms Ranges. Since 1975, the Army has contracted for Hydro-Ax™ work and in the early 1980s, purchased its own Hydro-Ax™. Although habitat work has continued on an annual basis since its initiation, little has been accomplished during some years due to manpower constraints and equipment breakdowns. Since 1975, over 1,500 acres have been cleared, benefitting wintering moose on Fort Richardson.

The moose population on Fort Richardson was relatively stable during the period from 1986 to 1994 (Quirk, 1996). This stability was due mainly to excellent summer feeding ranges, mild winters with light snowpack, and few predators in calving areas to affect productivity. Although winter habitat created by Hydro-Axing has generally helped to increase the food supply, in some areas it has been limited and in others, overbrowsed. A dramatic decline in the moose population occurred in the winter of 1994–1995 when a deep snowpack persisted for the longest duration in over 25 years in

southcentral Alaska. Results from the November 1996 aerial moose survey indicated a 26 percent loss in the total number of moose on Fort Richardson since the previous survey in 1994.

Although moose hunting occurred on Fort Richardson prior to 1965, no information is available as records were not maintained. From 1965 to 1974, several moose hunts were organized and carried out by ADF&G and Fort Richardson biologists. During the period 1975 through 1981, no moose hunting occurred on Fort Richardson. From 1982 to 1986 moose hunts on Fort Richardson were guided due to the safety hazards of using big game rifles close to the Glenn Highway and near residential areas in east Anchorage. The ADF&G and the Army provided the guides necessary to conduct the hunt. Even with guided hunting, safety was becoming a serious issue of concern. In addition, the guided hunts required significant amounts of manpower and logistical support, which were not only an unnecessary burden to the Army and ADF&G, but also interfered with the training mission. As a result, in 1987, the Fort Richardson moose hunt was converted to archery only. Two years later, in 1989, a black powder (rifle) hunt was added in a designated area of Fort Richardson north of Eagle River.

A limited archery hunting program initiated on Elmendorf AFB in 1990, is considered part of the Fort Richardson moose management program as the animals move easily between installations. Prior to this hunt, Elmendorf AFB offered a refuge for moose during hunting season. (Elmendorf AFB, 1994)

The target population size for the Fort Richardson moose herd (including Elmendorf AFB and Ship Creek) has fluctuated over the years but is currently set at 500 animals. This is a reduction from years past and is based on concerns such as moose-auto collisions, conflicts with people and pets, loss of considerable acreage of former moose habitat to construction and development, declining productivity of the herd, and excessive pressure on remaining winter habitat on Fort Richardson. Declining productivity of the herd is indicated by a significant decrease in calf:cow ratios from 60 and 58 calves/100 cows in 1986 and 1987 to 28–38 calves/100 cows in all subsequent surveys beginning in 1988 (Table 8-3a). Although natural fluctuations

occur in the environment, such large differences over several years of surveys are indicative of other confounding problems.

The Fort Richardson moose hunting season begins the day after Labor Day in early September and terminates on November 15. Both bow and black powder hunting are allowed during the early hunt which takes place before, during, and after the breeding season (rut). The late hunt (December 15 to January 15) is for bow hunters only. Annual harvest levels and sex ratios will be cooperatively determined by USARAK and ADF&G.

#### *14-4a(2) Other Game Species*

Other large mammals found on Fort Richardson include black and brown bears and Dall sheep. These animals, for which there is very limited data, are far less abundant than moose and are not hunted.

Small game (mainly spruce grouse and snowshoe hare) population trends have not been monitored closely. Currently, the snowshoe hare population is increasing. The status of the spruce grouse population is unknown. In recent years, the ADF&G introduced ruffed grouse into several areas of southcentral Alaska. Future management practices on Fort Richardson may include introduction of this species on post.

Most furbearers are difficult to monitor on Fort Richardson. Increasing beaver damage in ponds and drainages suggests that their numbers are growing. In recent years, a wolf pack was established or moved into western Fort Richardson and Elmendorf AFB, effectively doubling the number of wolves in the area to an estimated 15.

Waterfowl hunting on the post is limited to areas north of Eagle River. Canada geese populations in the Anchorage area are increasing, and with the initiation of goose hazing on Elmendorf AFB in 1996, the number of geese using Fort Richardson is growing.

Appendix 14-4a(1) indicates harvest levels of moose on Fort Richardson since 1987. Harvest data for some small game and furbearers on the post is available in the Natural Resources files, but much of the raw data has not been tabulated.



## 14-4b Game Harvest Strategies

Data in the Fort Richardson Natural Resources Branch files regarding harvest and population status is not repeated in this INRMP except to make specific points. Harvest information on small game has been collected from Fort Richardson hunters through a system requiring either sign-out at the main gate or a mail-in of harvest data by the end of each year. At the time of sign-out, harvest information is recorded. Fish harvest is monitored through an ADF&G statewide harvest survey. Small game harvest data is not very useful due to the mail-in provision, which is often ignored or inaccurate. Beginning in 1998, hunters will be required to physically return their checkout sheet to the Main Gate with harvest data recorded at the end of each hunting day. This will greatly facilitate the collection of small game harvest data. The collection of harvest data will be an important element of the Wildlife Inventory and Monitoring Action Plan (Appendix 1).

Before hunting on Fort Richardson, individuals are required to present to the main gate a valid State of Alaska hunting license, state permit or harvest ticket (if appropriate), and a Fort Richardson Hunting/Fishing permit. Persons can sign for any two hunting areas open for that day. The Fort Richardson permit is obtained by attending a Safety Orientation Briefing. Individuals not stationed or employed on Fort Richardson or Elmendorf AFB who wish to fish on the post are required to obtain a visitor's pass at the main gate. Fort Richardson hunting and fishing regulations are found in USARAK Regulation 190-13, *Enforcement of Hunting, Trapping and Fishing on Army Lands in Alaska*.

### 14-4b(1) Moose Harvest

The archery season dates for moose hunting on Fort Richardson are normally the first day after Labor Day through November 15, and December 15 through January 15. These are special permit hunts with up to 100 permits issued, on average. Each permit identifies the specific sex of the moose to be taken, as determined by USARAK and ADF&G biologists. The bag limit for these hunts is one moose.

Muzzle-loading rifle moose season was initiated on the post in 1989. Designated areas open for this hunt

are north of Eagle River. As with archery hunts, muzzle-loader hunts are by special permit only. An average of 25 permits are issued each year. Season dates are from the day after Labor Day through November 15 with a bag limit of one moose of designated sex. The muzzle-loading rifle season will likely remain unchanged over the next five years.

Due to its close proximity to Anchorage and its high hunter success rate, the Fort Richardson moose hunt has become the most popular hunt in the state. This has resulted in ever increasing demands and competition for hunting permits.

With the exception of major habitat changes and severe weather conditions, archery and black powder hunting present the most significant impact on the post moose herd. The majority of moose hunting is archery, and will continue to be so during 1998–2003.

Harvest goals in the past have been based on producing or maintaining a specific number of moose on the post. This approach considered habitat condition and moose abundance, yet focused on a finite herd size objective.

There is some concern over the amount and condition of winter range as well as moose reproductive levels (Sinnott, personal communication and Fort Richardson moose reports). Elmendorf AFB (1994) reported heavy browsing with plant mortality (especially willow) occurring. This report noted that snowshoe hares also browse on the willow. As Appendix 14-4a(1) indicates, harvest has been relatively stable.

A Moose Cooperative Management Plan (unsigned) (Gossweiler and Harkness, 1992) for Fort Richardson was prepared in 1992. The plan requires that any changes to the existing hunting parameters be presented to the Alaska Board of Game in a joint Army/ADF&G proposal following census and review of data. This process will be followed in 1998–2003.

Specific objectives of the Cooperative Moose Management Plan (Gossweiler and Harkness, 1992) were the maintenance of a herd of 600 moose (adjusted based on habitat and population data) with 35–40 bulls per 100 cows. In 1998–2003, moose harvest numbers will be based on population size and com-

position, reproductive status (primarily calves/100 cows), relative browsing levels (percentage of leaders browsed), and weather with a goal of maintaining moose numbers within habitat carrying capacity. This level is dynamic, but moose populations below carrying capacity will reproduce at optimum levels to provide good sustainable harvest over the long period. The 600-moose goal has been changed recently to 500 moose.

Strategies for managing the Fort Richardson moose herd may include increasing or decreasing the number of hunters, reducing total season length, taking more moose from certain areas (e.g., the south side of the post near Anchorage), and enhancing winter habitat as discussed in Section 14-3. Data on browse condition (Section 12-3a) and moose numbers and reproduction (Section 12-4a(1)) will be used to help evaluate the success of moose management.

It is important to note the difficulty in accurately determining the carrying capacity for moose on Fort Richardson. Good productivity is normally an indicator of ample carrying capacity, but a moose herd can exceed carrying capacity and not appreciably decrease in numbers for a long time, provided winters are not severe and predation is low. It is therefore important to continually monitor productivity.

Another indicator of carrying capacity is the level of browsing intensity on the primary browse species. When the plants (some species of willow can be used as indicator species) support an overwinter browsing intensity of 40–75 percent utilization of the available stems over several years, the moose herd would be considered to be at or near the carrying capacity. This would be the level of utilization that the plants could sustain over the years without reducing vigor and the biomass of the plants, and supplying sufficient nutrition to maintain a healthy and productive moose herd. A higher level of browse utilization (e.g., over 80–90 percent) of the habitat sustained for several years would result in plants becoming unproductive, stunted, decadent, and producing low biomass. Moose habitat that is under utilized (e.g., less than 20–30 percent of the stems taken) would result in plants growing tall and out of reach for feeding moose. The available biomass of under-utilized or unbrowsed plants also would decline substantially over the years as the plants increase in size and maturity.

#### *14-4b(2) Spruce Grouse Harvest*

An average of about 250 spruce grouse are harvested on Fort Richardson each year, with most being killed soon after the opening of the season. Season dates are identified in the current ADF&G hunting regulation booklet. The bag limit is five per day. Harvest levels for grouse are not expected to change over the next five years.

#### *14-4b(3) Snowshoe Hare Harvest*

Snowshoe hare harvest is very small with an average of about 100 per year. Snowshoe hare season is identified in the current ADF&G hunting regulation booklet. A daily bag limit is five. Harvest levels for snowshoe hare are not expected to change over the next five years.

#### *14-4b(4) Ptarmigan Harvest*

Ptarmigan harvest is insignificant with an average of about 50 per year. Ptarmigan season is identified in the current ADF&G hunting regulation booklet. A daily bag limit is 10. Ptarmigan harvest levels are not expected to change over the next five years.

#### *14-4b(5) Coyote Harvest*

Coyote harvest information is unavailable. Coyote numbers, which in the past have been relatively high on the post, now appear to be decreasing. Studies on these and other furbearing animals are needed to more accurately understand population sizes and dynamics. Coyote hunting is open on the post with a season limit of 1. Open season is in accordance with ADF&G hunting regulations. Hunting is restricted to shotguns. Immediate closures may occur at the discretion of USARAK biologists (USARAK Reg. 190-13).

#### *14-4b(6) Beaver Harvest*

Problem beavers are controlled by the Natural Resource Branch and the Wildlife Protection Section of the Law Enforcement Command (LEC).

#### *14-4b(7) Fish Harvest*

Fort Richardson is part of the ADF&G Anchorage Management Area for fisheries. Fish caught on the post come almost entirely from five major lakes (Clunie, Gwen, Otter, Thompson, and Waldon

Lakes), that are all stocked. Dishno Pond is also usually stocked with catchable rainbow trout. Fish stocking is addressed in Section 14-8(b).

ADF&G surveys indicate that Fort Richardson's lakes are a very significant resource for Anchorage area anglers. From 1977 through 1993, 14–28 percent of Anchorage area freshwater anglers fished Fort Richardson's lakes, accounting for 31 percent of the Anchorage Management Area harvest. Virtually all fish stocked in post lakes are harvested, but only after the fish are caught an average of 2½ times.

Harvest information is collected by ADF&G's biologists through a statewide harvest survey. The survey, however, may not represent actual harvest, as youths (less than 16 years of age) are not included (Barry Stratton, pers. com.). Youths are thought to account for most of the angler effort in the Anchorage area.

In addition to stocked lakes, the post also provides fishing opportunities on Eagle River. Fishing below the Route Bravo Bridge on Eagle River is prohibited due to the Eagle River Flats Impact Area. Fishing is also prohibited on Otter Creek and within 300 feet of the outflow dam on Otter Lake. On Ship Creek, fishing is permitted beginning 300 yards downstream of the Fort Richardson Fish Hatchery only. For information and bag limits consult the ADF&G Cook Inlet Sport Fishing Regulations Summary.

Currently, Fort Richardson hunting and fishing permits are free, but anglers are required to carry them. A State sport-fishing license is also required of all persons 16 years of age and older. Alaska's Fishing regulations are fairly lengthy and complex. They can be found in the ADF&G's annual Sport Fishing Regulations booklet.

The following harvest information was obtained from the ADF&G's records and discussions with Barry Stratton, an ADF&G Fisheries Biologist.

#### 14-4b(7)(a) Rainbow Trout

The fishing season for rainbow trout is open continuously. The daily bag and possession limit is five, only one of which may be 20 inches or more in length. Anglers who harvest a rainbow trout that is 20 inches or more in length must immediately record

their harvest, in ink, on their harvest record card. There is a seasonal limit of two rainbow trout 20 inches or more in length from Cook Inlet waters.

Clunie, Gwen, and Otter lakes account for most of the rainbow trout harvest. Chester Creek also receives stocked trout and accounts for a small percentage of the harvest. Small populations of rainbow trout can be found in Ship Creek, but harvest levels are minimal.

Reported rainbow trout harvest for the three major trout lakes on the post for the period of 1989–1993 ranged from 8,185 to as much as 22,132. Future harvest is expected to remain at those levels.

#### 14-4b(7)(b) Landlocked Salmon (Chinook and Coho)

For landlocked salmon over 16 inches, there is no closed season. The daily bag limit is three and the possession limit is three. For landlocked salmon that are less than 16 inches, there is no closed season, but the bag limit is 10 per day with a possession limit of 10.

Reported landlocked salmon harvest from Clunie, Gwen, and Otter lakes for the period of 1989–1993 ranged from 1,022 to 3,802. Clunie and Otter lakes account for almost all landlocked salmon harvest. Harvest levels are expected to remain relatively constant for the next five years.

#### 14-4b(7)(c) Arctic Char/Dolly Varden

The season for arctic char or Dolly Varden is open continuously. The bag limit is five per day and five in possession. Clunie Lake accounts for the vast majority of arctic char harvest. Reported harvest of arctic char/Dolly Varden for post lakes for the period of 1989–1993 ranged from 122 to 795.

Dolly Varden are difficult to distinguish from arctic char. Some mis-identification and errors in survey reporting may occur. Dolly Varden are not stocked on the post, but a small population can be found in Eagle River. Harvest levels are assumed to be minimal.

#### 14-4b(7)(d) Arctic Grayling

The season for arctic grayling also is opened continuously. A daily bag limit is five with legal pos-



session being five. Harvest data for arctic grayling on the post is unavailable.

#### 14-4b(7)(e) King Salmon

Eagle River is closed to sport king salmon fishing from its mouth upstream to the Bailey Bridge on Poleline Road. For the portion of the Eagle River upstream from the Bailey Bridge to ADF&G markers in Chugach State Park campground, the season is four consecutive 3-day weekends (Saturday–Monday) commencing on Memorial Day weekend. A daily bag limit is one per day, and a total of two fish per season is the possession limit.

Anglers need a king salmon tag unless fishing for stocked king salmon in landlocked lakes. Fort Richardson waters are not stocked with anadromous king salmon. Harvest data relative to king salmon caught within the post boundary is unavailable.

### 14-5 Endangered Species

No federally listed endangered species have been found on Fort Richardson. Surveys for endangered species are relatively complete (Sections 8-3f and 12-4b).

#### 14-6 Furbearers

The trapping of furbearers is prohibited on Fort Richardson, with exception of nuisance beavers that may be removed by Natural Resources Branch personnel and/or Military Game Wardens with special State of Alaska depredation permits. This type of beaver control will continue through 2003. Coyotes are the only furbearer legal to hunt (shotguns only) on the post. Predator control of furbearers on Army lands in Alaska will not be authorized without the appropriate NEPA documentation, public meetings, and concurrence through Army staff channels to the Secretary of Defense.

### 14-7 Other Nongame Species

Ravens are an important Alaskan nongame species found on Fort Richardson. These conspicuous birds congregate on the post during winter. In 1994, USA-RAK funded ADF&G for a study of local raven ecology as part of an overall survey of plants and animals on the post. A total of 52 ravens were cap-

tured and fitted with radio transmitters in order to study movements and associated activities. Data indicates that some ravens appear to remain in a limited area (parking lot) while others move around (50 miles) in the course of a day. A few ravens travel long distances and may not return to the Anchorage bowl every year. Birds which have been radio-collared have been observed in the vicinity of Palmer, Wasilla, Nancy Lake, Point MacKenzie, Tok, Mentasta, Galena, Fairbanks, Skwentna, and McGrath. Three communal roosts have been located, two in Anchorage and one at the municipal landfill. Other potential roost sites include areas of Fort Richardson and the Chugach Mountains. Difficulty in pinpointing radio signals in heavily wooded areas has prevented identification of suspected roost sites. Compared to Anchorage and Eagle River, fewer ravens use Fort Richardson and Elmendorf AFB. The density of ravens on both installations appears similar to rural areas. ADF&G biologists will continue to monitor raven movements through 1998.



*Ravens are found throughout Fort Richardson, especially in winter.*

The on-going surveys of neotropical migratory birds should provide some indication of the trends in populations among some of these species as well as the group of birds as a whole. If the Monitoring Avian Productivity and Survivorship (MAPS) program is continued (Section 12-4c), options for better management of neotropical migrants may become more apparent. Development of a management plan will be considered toward the end of the five year period covered by this INRMP.

The wood frog (*Rana sylvatica*) is the only amphibian known to occur on Fort Richardson. Little is known concerning the population status of this frog in southcentral Alaska. A graduate student at Alaska Pacific University, and ANHP, have initiated a volunteer-based breeding frog survey to commence in spring 1998 and continue indefinitely. This effort will provide data on local frog distribution, baseline populations, and timeline for the breeding season. In addition, the USFWS has proposed a study using mark-recapture techniques to evaluate population dynamics. Initiation of this study will be dependent upon personnel and funding availability.



*The wood frog is the only amphibian known to occur on Fort Richardson.*

Six species of bats are known to occur in Alaska, however, they are not found in abundance and are primarily limited to the southeast. The little brown bat (*Myotis lucifugus*), the most common and wide ranging bat in the state, is found on Fort Richardson. It prefers to roost in small colonies in abandoned buildings, mine tunnels, and caves, or may be found near a permanent source of water. A single little brown bat can consume as many as 1,000 mosquitoes a night. The little brown bat is known to hibernate in southeast Alaska; however, its migratory patterns in Alaska are not well understood. More winter records are needed to determine migratory patterns of bats in Alaska. Use of pesticides (either by direct exposure or indirectly through ingestion of sprayed insects), disturbance, or destruction of roosts, and loss of foraging habitat have resulted in a drastic decline of little brown bats in many areas. Nationwide, over half of all bat species are in trouble. Bats generally produce only one offspring per year, so recovery can be a lengthy process. Little

is known about the little brown bat on Fort Richardson. University of Alaska, Anchorage graduate students have expressed an interest in conducting studies on Fort Richardson to determine current bat population and distribution, monitor population trends, identify day and night roosts, and map migration routes. Sources for funding these studies are being sought.

Many habitat-protection measures discussed in Sections 13-3 and 13-5, as well as forest ecosystem restoration, LRAM, wetlands management, and water quality management (discussed in Section 14), will benefit nongame species in general. This is consistent with ecosystem management strategies.

## 14-8 Transplants and Stocks

Transplanting and stocking are techniques for enhancing existing populations or introducing new species to an area. Transplanting implies releasing wild animals, while stocking implies putting pen-reared animals onto an area.

### 14-8a Transplanting and Stocking Wildlife

USARAK is committed to preserving and enhancing biodiversity. Prior to any introduction of a new species to the post, there will be complete NEPA documentation and consultation with partners of this INRMP.

The only potential for such transplanting of wildlife in 1998–2003 is the ruffed grouse. This interior Alaska native species could add to Fort Richardson's hunting program. The ADF&G has been transplanting birds to sites just north of Anchorage. The Fort Richardson-Elmendorf AFB area is another potential site. Birds established on Fort Richardson could be hunted, and Elmendorf AFB could be used as a source of birds for additional transplants (Elmendorf AFB, 1994).

### 14-8b Fish Stocking

Fort Richardson is part of the ADF&G's Anchorage Management Area for fisheries. There are 30 stocked lakes in this management area. Five are on the post: Clunie, Gwen, Otter, Thompson, and Waldon. Dishno Pond also may be stocked and

managed more intensively in the future. The stocked lakes have a significant impact on the Anchorage Management Area in that they receive 23 percent of ADF&G stocking resources. This project is mainly directed at releasing hatchery-raised fish and monitoring effort, catch, and harvest levels through the Statewide Harvest Survey.



*Five Fort Richardson lakes are stocked with fish by ADF&G.*

A fish hatchery and rearing facility, located on the post on Ship Creek (see Figure 10-2), is operated through the joint efforts of ADF&G and the post. In return for this Real Property lease, ADF&G stocks Fort Richardson's lakes at no cost to USARAK. Stocked species include rainbow trout, landlocked salmon, Arctic char, and Arctic grayling. Wild-stock fisheries in post waters are minimal, although small populations of Dolly Varden and rainbow trout can be found in Eagle River.

Otter and Clunie lakes attain depths of over 30 feet and may contain warm springs that provide sufficient oxygen levels for supporting fish over winter. Thompson and Waldon lakes are smaller in surface

area and not as deep as Otter and Clunie lakes. They are therefore marginal in supporting over wintering fish stocks. Some years in these lakes are total failures with no fish surviving over winter. Gwen lake and Dishno pond are shallow water bodies (eight feet or less) that never have fish survive the winter.

Gwen lake supports a large population of fresh water amphipods in summer that provide a rich food source for fish stocks. The amphipod population is thought to flourish due to the fertilizer effect of the winter killed fish stocks. Rainbow trout released in Gwen lake grow faster and put on weight at higher rates than in any lake in southcentral Alaska.

Rainbow trout concentrate along the shores of Fort Richardson lakes in the spring and attempt to spawn, but due to inadequate spawning habitat, no spawning takes place in lakes. Past studies of Fort Richardson lakes have found slow growth for fish in Clunie and Thompson lakes, possibly due to tape worms that were frequently found in the intestines of fish from these lakes.

Fish are stocked in Fort Richardson's lakes throughout the year, but most commonly between mid May and September. Stocking levels for 1998–2003 are expected to remain at current levels, although they may be adjusted to reflect current angler use trends or fish availability (Barry Stratton, personal communication). Fort Richardson has contour maps of fishing lakes and ponds, which will be added to the GIS database.

#### *14-8b(1) Rainbow Trout*

The total number of rainbow trout stocked in Fort Richardson's lakes annually from 1990–1997 ranged from 19,668 to 68,778. Included in these totals are an additional 1,000 trout that Otter Lake receives annually to support a kid's fishing derby. Chester Creek was stocked with between 4,606 and 7,700 rainbow trout per year for the period of 1990–1997.

Stocking rainbow trout is considered a “put and take” fishery. This is primarily because a lack of oxygen found in shallow water and ice cover, results in winter kill of stocked trout. Lakes that over winter fish do so in low numbers, as a high percentage of the stocked fish are caught during the sum-



mer fishing season. Stocking levels of rainbow trout are expected to remain at or near current levels for the next five years.

#### *14-8b(2) Landlocked Salmon (Chinook/Coho)*

For the period of 1990–1997, the annual stocking rates of landlocked salmon ranged from 9,000 to 28,000. The majority of landlocked salmon stocks are released in Clunie and Otter lakes. Stocking levels will remain at the current level for the next five years but may be adjusted to reflect current angler use trends or fish availability (Barry Stratton, pers. com.). Coho salmon smolt were released in Ship Creek at a rate of 54,764 to 225,000 annually over the period of 1990–1997.

#### *14-8b(3) Arctic Char*

A total of 11,750 arctic char were released in Clunie and Gwen lakes from 1990 through 1997. Additionally, in 1990, 500 arctic char were released in Thompson Lake. During 1998–2001, arctic char will only be stocked in Clunie Lake (Barry Stratton, personal communication).

#### *14-8b(4) Arctic Grayling*

Four thousand arctic grayling were released in Waldon Lake in 1993. At this time, there are no plans for releasing arctic graylings into Fort Richardson's lakes.

#### *14-8b(5) King Salmon*

King salmon smolt were released in Ship Creek and Eagle River over the last five years. Eagle River has received between 102,100 and 121,066 per year. Ship Creek has received between 104,624 and 217,557 per year. ADF&G proposals are for Ship Creek stockings to remain at 210,000 for 1997 and 1998, but the Eagle River king salmon smolt stocking program has been terminated.

Potential actions include reestablishment of king and coho salmon runs in Ship Creek above the hatchery and below the upper dam, in conjunction with the Ship Creek Improvement Initiative led by the Municipality of Anchorage Citizen Advisory Group and the Mayor.

## 14-9 Wetlands Management

Section 13-5, Special Area Protection, includes provisions for protecting the quality of wetlands on Fort Richardson. These include using the NEPA process to identify wetland conflicts with regard to planned actions, review of projects and activities involving wetlands, and those special provisions to protect and restore ERF. Additionally, other sections of the IN-RMP have provisions to protect water quality and, therefore, wetlands. These sections include Forest Management (14-2), LRAM (14-11), and Special Area Protection (13-5) sections.

Wetlands protection has been strengthened by the completion of a comprehensive post-wide wetland inventory (Lichvar and Specher, 1996). Further studies to include wetland functions and values will also help provide information that will be useful in wetlands protection and enhancement.

NEPA is the primary means to identify threats to wetlands on Fort Richardson. NEPA requires that projects be evaluated for possible impacts on wetlands areas. In most cases, USARAK Natural Re-



*Fort Richardson's wetlands have been identified and delineated.*

sources personnel makes initial evaluations. In accordance with the Clean Water Act Section 404, projects with potential impacts are referred to COE to determine if jurisdictional wetlands are involved and to establish mitigation procedures. Permits are required by the COE for most projects in jurisdictional wetlands.

In 1998–2003, ERD will take the measures listed below to protect and manage wetlands on the post:

- ▶ Review all projects involving wetlands using the NEPA process within Natural Resources Branch
- ▶ Encourage project managers to coordinate early with ERD to determine adverse impacts to wetlands and permit requirements
- ▶ Constrain development and training to avoid wetland impacts to the maximum extent possible and mitigate unavoidable impacts on wetland functions
- ▶ Implement cleanup actions at ERF and continue to impose restrictions on the firing of munitions into this sensitive area
- ▶ Incorporate wetlands conservation education into Environmental Awareness programs
- ▶ Review and implement pertinent recommendation from the proposed wetlands study expansion

USARAK will develop a Wetland Management Action Plan for inclusion into this INRMP (see Appendix 1). This will also include riparian areas. Appendix 1 contains a description of the Plan, its compliance authorities, and budget priority.

## 14-10 Water Quality

Water quality reflects environmental pollution, including erosion. Maintaining clean water is an important goal of this INRMP. USARAK plays a key role in the supply of high-quality water for human use to Fort Richardson, Elmendorf AFB, and the Municipality of Anchorage. There are backup drinking water wells, but they are not needed at this time.

Fortunately, the water quality on Fort Richardson is very good, and there is no reason at this time to

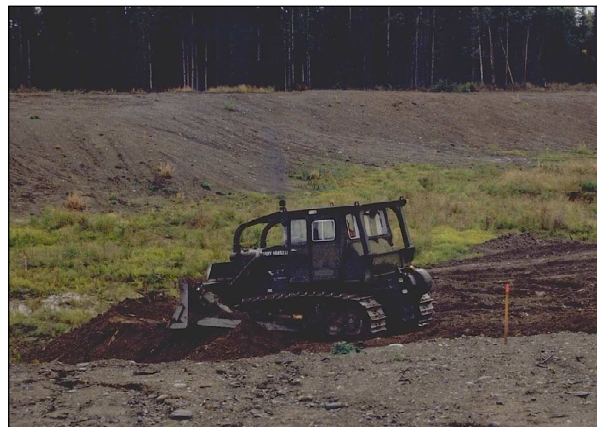
suspect that this will change. Creeksides, stream banks, lake shores and immediately adjacent areas are easily damaged and are therefore protected by specific restrictions on training and recreational use. Erosion is currently not a significant threat to water quality and the institution of LRAM (Section 14-11) will further guard against any future threats. Development is not allowed along Ship Creek, and training is restricted in the vicinity of both Ship Creek and the North Fork of Campbell Creek. Sections 13-5 and 14-2h(3) describe these special protection features.

Groundwater management consists of restoration projects associated with individual sources of pollution. These restoration projects are not considered as natural resources management and are not included within this INRMP.

## 14-11 Land Rehabilitation and Maintenance

LRAM, a component of ITAM, involves repair of damaged lands and use of land construction technology to avoid future damage to training lands. LRAM uses technologies such as revegetation and erosion control techniques to maintain soils and vegetation required for accomplishment of the military mission. These efforts are specifically designed to maintain quality military training lands and minimize long-term costs associated with land rehabilitation or additional land acquisition.

Erosion control projects and LRAM often overlap. LRAM is funded separately from general erosion



*LRAM involves repair of damaged lands and use of land construction technology to avoid future damage.*

control (a pollution compliance issue) and erosion control associated with road drainage (both pollution compliance and road maintenance issues). Erosion control, separate from the maintenance of training lands, is described in Section 14-12.

### 14-11a LRAM Planning Units

USARAK has contracted with the NRCS (Section 12-3a(6)) to classify and map soils on Fort Richardson. This survey will be useful in planning land rehabilitation projects. USARAK intends to use the Alaska Plant Materials Center (PMC) to develop an LRAM/Erosion Control Plan for Fort Richardson, expected to be prepared in 1998. Compliance aspects of this plan will be funded separately from environmental sources.

Projects will be designed on a site-specific basis. There is no need to close entire training areas for LRAM work at Fort Richardson. Each site-specific project will be coordinated through DPTSM. When scheduling conflicts occur, the ITAM Steering Committee will assist with project priorities and conflicts between LRAM and military operations.

The training area rehabilitation process will begin with identification of potential LRAM projects and approval of projects by the ITAM Steering Committee. The ITAM Coordinator (DPTSM) and the ITAM Project Manager (DPW) will ensure that projects can be accomplished without interference to the military mission. In some cases, specific sites might need to be placed off-limits to training for the duration of the project.

The ITAM Project Manager will also ensure that wetlands, water quality, wildlife, and cultural resources considerations are taken into account. ITAM and other natural and cultural resources personnel will visit project sites to ensure that all concerns are included in project planning. Appropriate NEPA documentation will be provided.

There are a variety of sources of LRAM project implementation assistance. These include in-house (DPW), private contracts, and/or turn-key operations using another agency. Final plans have not been formulated, but it is likely that USARAK will use the PMC for much implementation assistance.

### 14-11b Training Area Rehabilitation

The number of significantly damaged acres of training lands on Fort Richardson is undetermined, but the backlog is not excessive or expanding noticeably, probably due to the reduction in troops and the nature of the military mission. The best locations for military training are often the most damaged. Thus, it is critical that they be repaired and maintained in a condition that can support training.

In general, land rehabilitation on Fort Richardson will not require extensive use of heavy equipment or massive land reshaping. Care will be taken to ensure that heavy equipment operations do not disturb native vegetation and soils more than absolutely necessary.

Revegetation is the critical stage of training area rehabilitation and general land restoration. Commonly used techniques for erosion control and establishment of vegetation include seedbed preparation, seeding, mulching, fertilizer application, and protection from runoff until vegetation is established. Techniques will be specific to each project, and may incorporate technical recommendations from the PMC. The use of native species will be emphasized in accordance with the Presidential memo on the subject (Office of the President, 1994).

USARAK has repaired some damaged military lands in the past, but LRAM will provide a more carefully managed, intensive program to accomplish this mission. LRAM projects are often created as a result of damage caused by military training. Since new projects can result at any time, priorities often change. Some projects have been identified as candidates for repair as the new LRAM program is instituted. These include:

- ▶ Malemute Drop Zone improvements
- ▶ McLaughlin Range vegetation control
- ▶ revegetation of small arms range
- ▶ firing point vegetation control
- ▶ revegetation of Grezelka Range





*Land reparations at Malemute Drop Zone.*

Land rehabilitation is not an option in today's Army, but a necessity. The future of the military mission at Fort Richardson depends on the rehabilitation of damaged lands, returning them to training status in a manner that also meets the needs of ecosystem management. USARAK's LRAM program will achieve this in 1998–2003.

### 14-11c Hardened Sites

Hardened sites are areas that have been resurfaced with good base material. These sites also may be enhanced with vegetation plantings and protected by barriers. Hardened sites are most effective in areas that receive repetitive training within a small area to the point where vegetation is severely damaged and "realism" is already drastically compromised. Such locations include bivouac sites, firing points, and troop assembly areas.

USARAK has not used hardened sites as part of its ITAM program on Fort Richardson. However, the Malemute DZ bivouac area has been designated as a test site for this technology in Fiscal Year (FY) 1998. The ITAM Steering Committee will determine the need for additional hardened sites.

### 14-11d Malemute Drop Zone Maintenance

The size and importance of the Malemute DZ makes it a special case. This DZ is periodically cleared of most woody vegetation with the Hydro-Ax™. A priority LRAM project in 1998–2003 will be an evaluation of options for the maintenance of this DZ. One option would be to seed the area with a mixture of

clover, which, if successful, would provide ground-cover beneficial to both military training and wildlife.

## 14-12 Erosion Control

*"The nation that destroys its soil destroys itself."*<sup>26</sup>

Erosion control is included within the LRAM section (Section 14-11) to the degree that it is associated with the maintenance and rehabilitation of training lands. Erosion control also is associated with water pollution (environmental compliance) and road maintenance. The discussion of LRAM planning in Section 14-11a is pertinent to erosion control planning.

Most erosion control not associated with LRAM on Fort Richardson involves road drainage or maintenance. Maintaining road drainage is important for controlling sediment runoff. Road maintenance on training lands is a responsibility of the DPW.

When roads are repaired, drainage problems should be corrected, but range road maintenance at Fort Richardson, like many other Army posts, has a backlog due to budget cutbacks and higher priorities within the cantonment area. Thus, road drainage often is inadequate for proper distribution of runoff.

Roads can be damaged in a short period of time, especially during spring thaw. It is difficult to determine long-range priorities for correcting erosion associated with roads.

USARAK will develop an Erosion Control Plan for inclusion into this INRMP (see Appendix 1). This plan will provide considerable detail on road-associated erosion. Appendix 1 contains a description of the Plan, its compliance authorities, and budget priority.

Construction and maintenance of winter roads are important considerations on Fort Richardson. Military units must be able to move from place to place when the ground is frozen. A report, *Building and Operating Winter Roads in Canada and Alaska*, (Adam, 1978) contains useful information on this topic, and it will be used to help design and imple-

<sup>26</sup> Franklin D. Roosevelt, letter, 26 Feb. 1937.

ment projects associated with roads on Fort Richardson.

## 14-13 Cantonment Area Management

This section involves management of natural resources within or pertinent to the cantonment area. Routine grounds maintenance on Fort Richardson is conducted primarily by Roads and Grounds Maintenance, DPW. The Natural Resources Branch provides some professional assistance to Roads and Grounds Maintenance, but most of this program is not included in this section.

### 14-13a Cantonment Area Forest Management

Fort Richardson has parcels of mature native forest adjacent to improved sites within the cantonment area. In addition, large cleared areas around buildings have been planted with native and ornamental trees and shrubs. Together this constitutes an “urban forest” setting in the cantonment area. In the past, mortality of the planted trees was high and required constant replacement on a yearly basis. Practices today result in fewer trees being planted each year with more time being devoted to watering and other maintenance needs. Planting bigger, hardier trees and shrubs, although initially more expensive, has proven to be more economical in the long run. In some instances, professional landscaping companies are being contracted to plant trees



Contractors planting trees.

and shrubs, if they provide at least a two-year survival guarantee.

There is concern over a recent infestation of spruce bark beetles in the white spruce around the cantonment area. Efforts to deal with this problem are described in Section 14-15c.

#### 14-13a(1) General Tree/Shrub Landscaping

*A Landscape Management Plan* (Gossweiler, 1996) has been prepared and is currently being implemented. During 1998–2003, it will be updated and incorporated into the Landscape Management Action Plan (see Appendix 1). Appendix 1 contains a description of the Plan, its compliance authorities, and budget priority.

Trees and shrubs chosen for landscaping on the cantonment area have been selected from a recommended list of landscaping materials for southcentral Alaska. Two complete references for landscaping materials for Fort Richardson are the *Directory of Alaska Landscape Plant Sources* (Alaska Plant Materials Center, 1994) and the *Landscape Design Guide for the 6th Infantry Division (Alaska)* (David Evans and Associates, Inc., 1987).

Whenever possible, USARAK will use native species transplanted from surrounding areas for landscaping developed areas. Trees can be transplanted using a front end loader since their roots are only about 8-10 inches deep. Both native and ornamental species will be purchased and used for aesthetic purposes. Ornamentals to be used include crabapple (*Malus* spp.), lilacs (*Syringa* spp.), flowering almond (*Prunus glandulosa*), shrub dogwood (*Cornus* spp.), maple (*Acer ginnala*), cotoneaster (*Cotoneaster* spp.), Canada red cherry (*Prunus virginiana*), Colorado blue spruce (*Picea pungens*), May Day tree (*Prunus padus*), weeping birch (*Betula pendula*), etc. These will provide color on road medians, in front of dark treelines, around Otter Lake, etc., without pushing out native species or invading other areas.

USARAK is well aware of its responsibilities as outlined in the *White House Memorandum, Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds* (Office of the President, 1994). Specific requirements include:

- ▶ The use of regionally native plants for landscaping
- ▶ Construction practices that minimize adverse effects on the natural habitat
- ▶ Reduction of pollution by reducing the use of fertilizer and pesticides
- ▶ Using integrated pest management, recycling green waste, and minimizing runoff
- ▶ Implementing water-efficient practices
- ▶ Creating demonstrations of these practices to promote their use elsewhere
- ▶ Pruning lower branches of full-crowned spruce in fall
- ▶ Thinning denser stands to reduce competition and increase tree vigor
- ▶ Promoting healthy trees by proper watering and fertilization
- ▶ Spraying appropriate pesticides prior to the end of May

Appendix F in *Natural Resources Management Plan* (Elmendorf AFB, 1994) contains *Sample Specifications for Landscape Plantings on Elmendorf AFB, Alaska*. This detailed, checklist-type, sample scope of work is a good reference for landscaping and grounds maintenance in general.

Attempts will be made to reduce the high mortality of trees transplanted in the cantonment area. Emphasis will be placed on planting fewer trees in a given year and improving efforts to protect them. This will require installing effective tree guards such as metal stakes, guying the trees to prevent damage during wild storms, and the use of tree trunk guards to prevent sun scalding. Educational efforts also need to be directed to turf maintenance operators to avoid close mowing of grass next to large trees. The mower often makes contact with the tree, damaging the bark, and providing an opportunity for disease or insect damage to occur. This eventually results in mortality of damaged trees.

#### *14-13a(2) Spruce Bark Beetle Considerations*

Spruce bark beetles have infested spruce trees within and adjacent to the cantonment area. This beetle prefers larger trees, that have more ornamental appeal, and their mortality rate can be very high. Primary techniques for preventing infestation are:

- ▶ Avoiding damage to trees during construction and other activities
- ▶ Removing damaged trees, especially wind-thrown trees, and stumps and pruning debris prior to mid-May

Current practice is to use the pesticide Sevin SL<sup>®</sup> on trees greater than six inches in diameter. The Cooperative Extension Service (1991) has a publication, *Spruce Bark Beetles, Control Options for the Home or Lot Owner*, which can help identify infected trees and details prevention and control options. Another publication, *Spruce Bark Beetles in Firewood* (ADNR, 1992), provides ways to minimize the spread of spruce beetles by properly using firewood. When killed by bark beetles, white spruce trees serving ornamental and aesthetic purposes in the cantonment area will be replaced with beetle-resistant conifers such as Colorado blue spruce.

#### *14-13a(3) Tree City U.S.A.*

Fort Richardson has been designated as a “Tree City U.S.A.” by the National Arbor Day Foundation since 1995, and will maintain that designation in 1998–2003. This status depends upon an annual Arbor Day celebration with a proclamation issued by the Post Commander,



*Fort Richardson is one of only two Tree City USAs in the State of Alaska.*

a tree ordinance with policies for tree planting and maintenance, establishment of a Tree Board to plan and maintain the tree management program, and an annual expenditure of at least \$2 per capita on urban tree management. In 1998–2003, these conditions will be met by the Fort Richardson community.

#### *14-13b Urban Habitat Management*

Emphasis on managing urban wildlife has opened new avenues for resource management. An emerg-



ing awareness that urban areas can be managed for wildlife and still be attractive, combined with reduced funding for grounds maintenance, has created new opportunities for habitat management within Fort Richardson's cantonment area.



#### *14-13b(1) Reduced Grounds Maintenance*

Programs for reducing grounds maintenance involve decreasing mowing and establishing forest, grassland, or wildflower areas to lower maintenance costs on improved and semi-improved grounds. The tradition of neatly manicured grass on military installations is often hard to change and it is difficult to generate acceptance of these programs.

Much of this manicured look came about in the 1950s with the hiring of agronomists. These programs were given big boosts in the late 1960s by Lady Bird Johnson, and her emphasis on beautification. Maintaining this appearance is becoming prohibitively expensive. Fort Sill, the installation that has won the most Communities of Excellence competitions, has removed about 700 acres from its mowing schedule and is now converting this land to wildlife habitat, saving tens of thousands of dollars in maintenance costs.

#### *14-13b(2) No-mow Areas*

"No-mow" is a designation for areas that are dropped from the grass mowing cycle. These areas are accepted by the public most readily when they are natural extensions of already wild lands, such as narrowing a mowed road shoulder or extension of a woody area into a field.

During the first season, some areas may be somewhat unsightly due to growth of undesirable plants.

Herbicides may be needed to eliminate early invader exotic species to promote faster recovery of native vegetation. This herbicide use, particularly spot treatment, may cause some temporary eyesores. There are also increased pest problems associated with wildlands near buildings. Experience on other installations has shown that these problems are relatively minor. No-mow saves money. Fort Sill calculated that savings would be about \$10,000 annually for every 100 acres removed from mowing.

Fort Richardson has reduced grounds maintenance on the cantonment area in recent years by decreasing the size of maintained turf areas. The greatest benefits have been gained by reducing the width of turf areas along roads and streets by 10 to 20 percent. Sections of turf areas furthest from roads and streets are no longer maintained and are allowed to revert back to a natural state. In some places tree lines are being established in front of areas to be removed from mowing. Remote areas on the cantonment such as the Warehouse Loop also have been removed from routine grounds maintenance.

#### *14-13b(3) Wildflowers*

The acceptance of reduced grounds maintenance and the planting of wildflowers have become associated with each other. This is probably an off-shoot of the tremendous publicity given to the roadside wildflower program in Texas and other places.

Wildflowers can be established at Fort Richardson, but not nearly as easily as in Texas. The science of establishing wildflowers is specific to regions, and many aspects of planting wildflower are not well understood. There also are problems with obtaining seed. In addition, these wildflower areas must be mowed annually, and they must often be replanted from time to time. Planting requires specialized equipment and seed mixtures.

Wildflowers were tried at Fort Richardson. With few exceptions, results were aesthetically and economically unsatisfactory. During 1998–2003, specific plantings of wildflowers will not be undertaken unless special circumstances dictate otherwise. The goal with regard to wildflowers is to let them occur naturally in no-mow sites.

## 14-14 Agricultural Leasing

Fort Richardson has no agricultural leases. Both the land and the military mission preclude this option.

## 14-15 Pest Management

### 14-15a Noxious Plant Control

Noxious plant control is carried out by the Fort Richardson Pest Control Shop. The golf course maintains some herbicides and uses its own personnel to apply them. In general, Pest Control Shop personnel apply herbicides on the golf course while the certified applicator at the golf course deals with fungicides. Dandelion control on the turf areas of the cantonment area is done annually in early summer.

#### 14-15a(1) Bluejoint Grass

The primary noxious plant community on Fort Richardson is bluejoint grass (*Calamagrostis* spp.). Although a native species, it is undesirable in some locations since it replaces native spruce and birch forest. This perennial grass is a primary invader of areas that have been opened to at least 40 percent sunlight. These conditions often are associated with range construction or spruce bark beetle outbreaks. As described below there are at least three ways to control bluejoint grass:

- ▶ Burning can be effective if fires are hot enough. Late summer burning conditions are generally too “green” for hot burns unless some sort of desiccant is sprayed to dry out green vegetation or there is fallen timber, such as from an earlier spruce bark beetle outbreak. Frozen soils are often a problem until greenup. Timing is ideal in late May or early June if soils are thawed or there is dead wood on the ground in sufficient quantities to generate the needed heat. The Chugach National Forest has a prescribed burning program (Dr. Ed Holsten, pers. com.). Air quality permits for burning, however, are difficult to obtain.
- ▶ Blade scarification is a possibility. This works well in interior Alaska where there are deep alluvial soils. There is a question as to whether soils on Fort Richardson are deep enough to allow scarification without drastic loss of top-

soil. Scarification must be deep enough to get bluejoint grass rhizomes (Dr. Ed Holsten, pers. com.). Shallow soils on Fort Richardson reduce the viability of this option.

- ▶ The low toxicity herbicide called Roundup® does an excellent and effective job of killing this grass if applied late in the fall.

As stated in Section 14-3a(3), in 1998–2003, USA-RAK will control bluejoint grass on an opportunistic basis. Such control will be generally in association with other projects rather than solely to control this species.

#### 14-15a(2) Other Noxious Plants

Dandelion (*Taraxacum* spp.) control constitutes the major herbicide use in the Fort Richardson cantonment area. Dandelions and other broad-leaf weeds are controlled throughout the cantonment area, with emphasis on high visibility areas.

Soil sterilants are used in areas where bare ground is required. Such areas include target areas on small arms ranges, ammunition storage facilities, live fire ranges where soldiers lie on the ground to shoot, and special areas where duds must be removed, such as hand grenade ranges.

A researcher studying spruce regeneration on Fort Richardson has used small quantities of Roundup® to control competition on sites where various treatments are being tested. The main species being controlled is bluejoint grass. Early fall treatment with this herbicide has shown promising results in terms of reducing competition for young spruce trees.

Devil’s club (*Oplopanax horridus*) is considered noxious due to its thorns that prevent use of areas where it abounds. But, unless it is within the cantonment area, it is not controlled.

Alder is considered noxious since it invades quickly after disturbance and prevents the establishment of more desired species. It is not specifically controlled except for specific purposes such as moose habitat improvement (Section 14-3a(3)).

### 14-15b Wildlife Conflicts

Wildlife conflicts on Fort Richardson, ranging from insects and small rodents to large mammals such as

moose and bears, are handled by three Command entities: USARAK Natural Resources, Provost Marshal's Office, and Pest Control Section of the DPW. The Provost Marshal and Natural Resources Branch, assisted by ADF&G, manage problems with large mammals. Small species, such as birds, rodents, and insects, are managed by the Pest Control Section.



*Coexisting with wildlife in urban situations sometimes requires patience and tolerance.*

Animal Damage Control (ADC), U.S. Department of Agriculture, has skills useful in resolving conflicts with wildlife. USARAK will use ADC on a reimbursable basis as required during the next five years through interagency fund transfers (MIPRs).

Although no formal agreement exists for interdepartmental pest management on Fort Richardson, the following breakdown of responsibilities and policies by species usually applies:

#### *14-15b(1) Domestic Pets*

Cats and dogs running loose within the cantonment area and on the ranges are the responsibility of the Provost Marshal using Military Police personnel. This is not normally done by Military Game Wardens but is taken care of by Military Police regular road units. Military Police road units and Military Game Wardens have access to standard equipment such as slip nooses and tranquilizer guns but are not properly or routinely trained for use of dart guns on domestic animals. For this type of assistance, USARAK Natural Resources, Elmendorf AFB Game Wardens or ADF&G are notified. Generally, stray dogs and cats are a minor problem at Fort Richardson.

#### *14-15b(2) Insects and Small Mammals*

Pest Control handles insect and small mammal problems within the cantonment area. Common pest problems include German cockroaches (the biggest problem on the post), mosquitoes, spiders, ants, fleas, hornets and wasps, silverfish, firebrats, beetles, and small mammals such as shrews, deer mice, voles, and squirrels.

#### *14-15b(3) Beavers*

Beavers occasionally create problems on Fort Richardson by plugging water intake pipes, preventing natural drainage of lakes and ponds, and denuding lake shores of vegetation. Overflow resulting from dammed areas leads to erosion of trails and roads and problems with power-plant intakes. Beavers causing significant problems are controlled by USARAK Natural Resources, and the Military Game Wardens under depredation permits issued by ADF&G.

#### *14-15b(4) Moose*

The Fort Richardson Natural Resources Branch and the Military Game Wardens jointly handle moose complaints and investigate injured and road-killed animals. Road-killed moose must be reported to the Alaska State Troopers as soon as possible so that the meat can be salvaged. The Fort Richardson Chaplain's office maintains a list of eligible charity recipients for salvageable meat. Road-killed moose on Fort Richardson are a relatively small problem with fewer than six killed annually.

Conflicts sometimes occur between moose and people during calving season and have resulted in injuries and, in rare instances, death. Closure of trails and placement of warning signs until cows with young calves have left the area has proven effective in reducing such conflicts.

#### *14-15b(5) Bears*

The Fort Richardson/Elmendorf AFB area has an estimated 30-40 black bears (including sows with cubs) and three to five brown bears. Bears occasionally damage homes, facilities, and personal property, and sometimes injure, or even kill, people (the latter being relatively rare).



Initial response to a potential bear problem on Fort Richardson is carried out by the Military Game Wardens. It is their responsibility to assess the situation and determine if more assistance is needed. In most cases, the responding officers can resolve the problem by temporarily restricting public access to the area until the animal leaves or by chasing the bear away. The latter is accomplished by first using cracker rounds and then, if that does not work, rubber bullets. As soon as is practical, responding officers will notify USARAK Natural Resources, either by telephone or radio, of the situation and how it was resolved. As with all wildlife encounters on USARAK-controlled lands, unless the animal poses a serious threat to human safety or is critically injured, no action will be taken by initial responders that might result in injury or death to the animal without authorization from the USARAK Chief of Natural Resources or the USARAK Chief of Environmental Resources.

If initial responders determine that the situation warrants further assistance they will immediately notify, by radio or telephone, both USARAK Natural Resources and the Elmendorf AFB Conservation office. Subsequent procedures to be followed are outlined in a multi-agency memorandum of agreement for dealing with bear/human conflicts on both military installations. This Memorandum of Agreement (MOA) (Appendix 5-10) provides for the establishment of a joint human/wildlife conflict advisory board and includes specific responsibilities of each agency involved.

Mountain and glacier training are a key element in USARAK mission. A Land Use Permit from the State of Alaska enables USARAK soldiers to conduct training exercises on the nearby Knik Glacier. A stipulation of the permit was the preparation and implementation of a Bear Management Plan to reduce the potential for bear and human interaction during this training. The plan, as prepared and used since 1990, will continue to be implemented until superseded or revised.

#### *14-15b(6) Cliff Swallows*

Construction of nests by cliff swallows in post housing areas and work facilities creates a nuisance and health concern. Droppings are unsightly and are a

growth medium for a fungus that can cause respiratory infection (histoplasmosis). Swallows also are infested with mites (Elmendorf AFB, 1994).

The Fort Richardson Pest Control Shop responds to calls regarding swallow nesting problems within the cantonment area. The most practical and ethical way to resolve these conflicts is to remove or destroy the nests prior to egg laying. In the past, permits from both ADF&G and the USFWS have been required to remove swallow nests. In 1997, the USFWS suspended the requirements for a permit to remove swallow nests. In lieu of the permit, they requested a report at the end of the season describing the nests that were removed. ADF&G still requires permits be obtained but allows nests with eggs to be removed under special conditions such as where droppings near windows or doors may affect human health, or around electrical power boxes. USARAK will continue to ensure that ADF&G permits are applied for on a yearly basis. The potential of using nesting platforms to attract swallows away from family housing quarters, aviation hangars, and other buildings will be investigated. Other remedies may include the use of repellent structures and materials in areas where nesting activity is discouraged.

#### *14-15b(7) Geese and Other Bird Strike Hazards*

The Canada goose population in Anchorage greatly expanded during the 1980s and 1990s—to over 4,000 by 1997. This can be attributed to an abundance of suitable nesting habitat and increased food sources from fertilized, turfed areas. As the goose population in Anchorage grew so did associated conflicts. Most complaints were related to fecal contamination of lawns, playgrounds, ball fields, and golf courses. On September 22, 1995, an Aircraft Warning and Control System (AWACS) jet from Elmendorf AFB, north of Anchorage, crashed and burned as a result of Canada geese being ingested into and subsequently shutting down two of the four engines as the aircraft lifted off the runway. All 24 Air Force personnel in the aircraft died in the accident.

The tragic incident at Elmendorf AFB has sensitized the community to aircraft safety issues at all local airports. As a direct result of this concern, the USFWS and ADF&G, in 1996, organized the Anchorage Waterfowl Working Group (AWWG). The

group, comprised of state and federal agencies along with interested individuals and organizations, has developed a Goose Management Plan and associated Environmental Assessment that is expected to be implemented in 1998.

A summary of the actions planned to reduce the goose problems include a consensus of the AWWG to reduce the Anchorage goose population by half (2,000 geese) within four years. This would include habitat modification treatments, ongoing public education programs, egg collections, gosling transplants, and lethal methods.

USARAK, in coordination with the Alaska Army National Guard, has instituted a Bird Aircraft Strike Hazard (BASH) program at Bryant Army Airfield. As part of the program, the Army has and will continue to evaluate goose movements and use of the airfield, and the need for habitat modification to reduce aircraft hazards.

#### *14-15b(8) Predator Control*

There is a special provision contained within the Alaska administrative code requiring U.S. Army concurrence before any wolf control activities can be performed on military lands in Alaska<sup>27</sup>. Any predator control on Fort Richardson must be approved by USARAK, U.S. Army Pacific, and Department of Army and documented using the NEPA process.

#### *14-15b(9) Other Animals*

Pest Control handles most other animal problems as required. These include squirrels in attics and crawl spaces, rabid animals, etc. Each problem is evaluated individually for appropriate action. All other wildlife control problems are handled on a case-by-case basis by the Natural Resources Branch in cooperation with the Military Game Wardens.

#### *14-15b(10) Injured Animals*

Injured animals often are reported to the Military Game Wardens, especially if they are discovered after normal duty hours. Moose injured in motor vehicle accidents are one example of such incidents.

Injured wild animals are a specialized problem that often requires the expertise of wildlife biologists to

make decisions regarding rehabilitation or destruction of the animals. For this reason, the Military Game Wardens are required to contact personnel within USARAK Natural Resources prior to dealing with injured animals. Post veterinary personnel may be called upon to assist with injured animals.

### **14-15c Integrated Pest Management**

USARAK has a Pest Control Shop and Management Program at all three posts. Pesticide Coordinators at Fort Richardson and Fort Wainwright are active in the management of local pesticide operations, coordinating all pesticide actions with USARPAC.

In 1994, the Department of Defense developed a Measures of Merit Program for all military installations which requires a Pest Management Plan to be prepared, signed, and implemented. Other requirements include the reduction of pesticide use on all installations by 50 percent over a seven year period (1994–2000) and certified training of all pest control personnel.

Fort Richardson has a recently completed and approved Pest Management Plan. Reduction in pesticide usage on Alaskan installations is being closely coordinated with USARPAC. All Alaskan Army pest control personnel are in compliance with the basic training certification required by Measures of Merit.

#### *14-15c(1) Chemical Use*

All chemicals used on Fort Richardson are EPA-approved. Pesticide use on Fort Richardson has fallen dramatically over the last two years. Significant decreases in the number of soldiers based on the post has contributed to that reduction. Remodeling and new construction have also helped reduce the volume of pesticides used since these buildings are more pest resistant and new construction usually has fewer pest problems.

Reduced chemical use is a major goal of the pest management program. USARAK understands obvious and long-term threats to both humans and ecosystems from chemical abuses. The Pest Management program has switched emphasis to emphasizing surveillance before chemical application. More efficient

<sup>27</sup>Administrative Code Supplement, Article 5. Predator Control. 5 AAC 92.110. Control of Predation by Wolves.

equipment and techniques are adding to the reduction in chemical volume and toxicity.

The most difficult objective for Fort Richardson is the reduction of herbicides. In general, the acreage of improved grounds has not been reduced enough to allow for a 50 percent reduction in herbicides without changing the appearance of the post. Reduced grounds maintenance (see Section 14-13b) has eliminated about 1/8th of improved grounds since 1993, but significant future reductions are unlikely. Dandelion (an exotic species) control is especially difficult to achieve if herbicide reduction objectives are implemented.

#### *14-15c(2) Pesticide Certification*

At present, Pest Control has three certified applicators, and the golf course also has one. These positions are needed to provide minimum in-house capabilities. These personnel will undergo required refresher training, and any new personnel will receive training required for certification. USARAK has the option to use a combined Army, Navy, and Air Force pesticide training facility in Hawaii or the Army school at Fort Sam Houston, Texas.